

Patent claims

1. An air-conditioning installation, in particular for motor vehicles, having a compression refrigeration circuit of a refrigerant for A/C operation with a high-pressure region, a suction region and a connected stationary air-conditioning circuit, in particular for stationary air-conditioning operation when the compression refrigeration circuit is switched off, at least having:

- a compressor;
- an expansion valve;
- an evaporator as cooler for releasing refrigeration to the environment; and
- a thermal accumulator comprising a heat storage medium, the thermal accumulator serving as a refrigeration accumulator and as a condenser during stationary air-conditioning operation, and the refrigerant which is present as heat transfer medium being used to transfer the refrigeration from the thermal accumulator to the evaporator in the stationary air-conditioning circuit,

characterized in that the evaporator (5) and the thermal accumulator (6) are connected in series in terms of the flow of refrigerant.

2. The air-conditioning installation as claimed in claim 1, characterized in that a refrigerant collector (7) is arranged in the suction region of the refrigeration circuit, upstream or downstream of the evaporator (5) on the refrigerant side.

3. The air-conditioning installation as claimed in claim 1 or 2, characterized in that the refrigerant (11) is carbon dioxide

(CO₂) .

4. The air-conditioning installation as claimed in claim 2 or 3, characterized in that the refrigerant (11) is transported from the thermal accumulator (6) or from the refrigerant collector (7) to the evaporator (5) in the stationary air-conditioning circuit by a circulation pump (13) via a condensate line (14).

5. The air-conditioning installation as claimed in claim 2 or 3, characterized in that the refrigerant (11) in the stationary air-conditioning circuit is transported from the thermal accumulator (6) or from the refrigerant collector (7) to the evaporator (5) by the thermosiphon effect via a condensate line (14), which can preferably be closed by a switching valve (17), the evaporator (5) being arranged at a geodetically lower level than the thermal accumulator (6) or the refrigerant collector (7).

6. The air-conditioning installation as claimed in one of claims 2 to 5, characterized in that the refrigerant accumulator (7) in the stationary air-conditioning circuit or on the refrigerant side is arranged downstream of the thermal accumulator (6) and upstream of the circulation pump (13) or the evaporator (5).

7. The air-conditioning installation as claimed in claim 4 or 5, characterized in that the refrigerant collector (7) and/or the thermal accumulator (6) and/or the condensate line (14) are thermally insulated.

8. The air-conditioning installation as claimed in one of

claims 4 to 7, characterized in that the opening (14') of the condensate line (14) only projects into the refrigerant collector (17) to a depth such that the circulation pump (13) or the thermosiphon effect only sucks in liquid refrigerant (11).

9. The air-conditioning installation as claimed in one of claims 2 to 8, characterized in that in stationary air-conditioning operation a nonreturn valve (9) prevents refrigerant (11) from penetrating out of the high-pressure region into the power section comprising the evaporator (5) and the refrigerant collector (7).

10. The air-conditioning installation as claimed in claim 9, characterized in that the circulation pump (13) and/or the nonreturn valve (9) are integrated in the thermal accumulator (6) or the refrigerant collector (7).

11. The air-conditioning installation as claimed in one of claims 2 to 10, characterized in that the thermal accumulator (6) and the refrigerant collector (7) are integrated with one another.

12. The air-conditioning installation as claimed in one of claims 2 to 11, characterized in that the thermal accumulator (6) surrounds the refrigerant collector (7).

13. The air-conditioning installation as claimed in one of claims 2 to 10, characterized in that the thermal accumulator (6) and the refrigerant collector (7) are arranged separately.

14. The air-conditioning installation as claimed in one of claims 1 to 13, characterized in that the thermal accumulator

(6) and in particular the loading with refrigeration in A/C operation when the compression refrigeration circuit is running can be bypassed by an electrical or thermodynamic bypass valve (15) with a bypass line (16).

15. The air-conditioning installation as claimed in one of claims 1 to 14, characterized in that the heat storage medium (6') in the thermal accumulator (6) undergoes a phase change between the solid and liquid phase.

16. The air-conditioning installation as claimed in one of claims 1 to 15, characterized in that the evaporator (5) is of cross-countercurrent design.

17. The air-conditioning installation as claimed in one of claims 1 to 16, characterized in that, in particular when the thermal accumulator (6) has been fully loaded with refrigeration, the compression refrigeration circuit and the stationary air-conditioning circuit can be operated in parallel.